IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of

Buwalda, et al.

Serial No. **09/936,344** Examiner: **N. Bhat**

Filed: **September 10, 2001** Art Unit: **1761**

For: **FOODSTUFF CONTAINING DISCRETE STARCH PARTICLES**

D E C L A R A T I O N

The Assistant Commissioner
of Patents
Washington , D.C. 20231

Sir:

The undersigned, Cindy Semeijn of Fongersplaats 96, Groningen, the Netherlands, herewith declares as follows:

1. I am a Food Starch Specialist at the Food Competence Center of the international co-operative AVEBE in Foxhol, the Netherlands, one of the world's largest manufacturers of potato starch derivatives. I took up this position on January 1 of 2003. Before that I was associated to the Chemistry Department of AVEBE for a period of almost six years where I performed research on various starch applications, the last three years mainly food oriented. My specialisation is Chemistry of Starch.
I hold a PhD degree in Organic Chemistry from the University of Amsterdam, The Netherlands, and have reviewed numerous publications relating to Starch Chemistry, for instance in 2002 I acted as referee for submitted manuscripts to *Starch*, the International Journal for the Investigation, Processing and Use of Carbohydrates and their Derivatives.

2. I am co-inventor of the subject application as identified hereinabove. The invention is based on the insight that a foodstuff, that is prepared with the use of a starch that disintegrates into discrete particles when that foodstuff is

subjected to conditions of heat and/or shear, will exhibit beneficial properties of being short, smooth and shiny after heat and/or shear treatment; it was found that such a starch is obtained when it is crosslinked to such an extend that it is capable of disintegrating into discrete particles after heat and/or shear treatment. A foodstuff prepared with such a starch and subjected to heat and/or shear treatment exhibits the beneficial properties.

3. I have read and understood the office action of 22 August 2003 issued by the USPTO in relation to the subject application. The present declaration relates to point 5 of that office action wherein claims 1-9 and 11-12 of the subject application are rejected under 35 U.S.C. 102(b) as being anticipated by Jeffcoat *et al.* EP 0 796 868 (hereinafter EP 0 796 868).

4. Based on experimental evidence, I believe that the method disclosed in EP 0 796 868 does not result in the foodstuff with the beneficial properties and characteristics of the foodstuffs prepared by a method of the present invention. In particular, no discrete particles are obtained. I herewith provide experimental support showing that the presently claimed method results in foodstuffs with different properties.

5. The tests as described below were performed under my supervision in the laboratories of AVEBE, Foxhol, The Netherlands in January of 2004. The tests and results were filed as AVEBE internal research report No. V04-005M.

6. In order to compare the methods of the subject application with those of EP 0 796 868, we carried out the methods as described in Examples 11 and 12 of EP 0 796 868, together with the methods of the present invention as follows:

Experimental Setup

A pudding and a fruit pie filling (Examples 11 and 12, respectively, of EP 0 796 868) were prepared as described in EP 0 796 868 and, separately, by a method as described in the subject application, the latter method comprising the use of a processing step of applying shear to obtain discrete particles.

Preparation of a hydroxypropylated starch ES 031209-1 as used in the Experiments

A 39 wt.% starch slurry was prepared from 1995 g starch (18.7% moisture) and 2160 g water. In this slurry was dissolved 180 g sodium sulphate. The pH was adjusted to 11-12 by addition of 470 g of a 4.4 wt.% sodium hydroxide solution.

Next, 122 g propylene oxide (DS max 0.21) was added to stabilize the starch and the hydroxypropylation reaction was allowed to proceed for 24 hours at a temperature of about 35 °C.

Next 187.6 µl (0.31 g) of phosphorous oxychloride ($POCl_3$) was added to cross-link the starch. The crosslinking reaction was allowed to proceed for 1 hour at a temperature of 25 °C.

The slurry was then neutralized to a pH of 5 using 6M sulphuric acid (H_2SO_4), filtered, washed with water and dried using conventional means. This starch was identified as ES 031209-1 starch.

Preliminary Remarks to the Experiments

There are some differences in the preparation of the stabilized and crosslinked starch between the description of EP 0 796 868 and the Experiments described herein. For one, it is not known whether the starch slurry prepared in Example 1 of EP 0 796 868 was prepared with 1000 grams of dry substance starch or whether the amount of moisture present in the starch was accounted for. Commonly, potato starch contains about 17-19 wt.% moisture. As a result, the description of EP 0 796 868 was not detailed enough as to specify exactly how much starch was used in that procedure. It is assumed that the amount of moisture was accounted for and a slurry with a starch content of 39 wt.% was therefore produced for crosslinking in the present experiments.

After the crosslinking reaction as described in Example 3 of EP 0 796 868, the reaction mixture is held at pH 3 for one hour, before being neutralized. The purpose of this step is to remove the propylene oxide still present in the suspension. This procedural step has no influence on the product properties.

Due to these differences in the preparation procedures between the ES 031209-1 starch as used herein and the starch as described in EP 0 796 868, we prepared a whole range of starch products with different crosslinking degrees and differences in degree of substitution. With all these products, similar results were obtained to those described in the experiments below.

Pudding (Reproduction of Example 11 of EP 0 796 868)

Ingredient	wt.%
Salt	0.1
Sugar	3.0
Skim milk powder*	7.2
Fat powder (Vana-lata 50E)**	4.56
Starch ES 031209-1	4.0
Water	81.14

* EP 0 796 868 uses Nonfat dry milk, which is generally termed skim milk powder in certain countries. The component is identical to that of EP 0 796 868.

** EP 0 796 868 uses powdered cream. Vana-lata 50E (Kievit, Meppel, The Netherlands) is a vegetable fat-filled milk powder with a fat content of 50%, and is comparable to a milk fat-based cream powder with a fat content of 50% (also known as powdered cream in certain countries, which term is used in EP 0 796 868). The component is comparable to that of EP 0 796 868.

Preparation of the foodstuff

- Blend all ingredients together
- Heat to 90°C
- Keep at 90°C for 10 minutes
- Split up into 2 samples, keep 1 sample apart (Pudding sample A), and shear 1 sample during 1 minute at full speed with a Silverson mixer (Pudding sample B)
- Cool to 50°C

Results

Puddings produced from both samples were short and smooth and had a comparable viscosity. It was clearly visible that the pudding prepared from Pudding sample A (EP 0 796 868, i.e. without the shearing step) was duller than the pudding prepared from Pudding sample B (present invention), which was subjected to a shearing step. The pudding prepared from Pudding sample B was very shiny.

Below are photographs of the surface of the two puddings prepared (figure 1). It was clearly visible by visual inspection of the pudding surfaces that there was a marked difference in gloss and shininess between the two puddings, which difference is difficult to reproduce in a photograph.

Below are also microscopic pictures of the two puddings. The difference in granule size is apparent (figure 2).

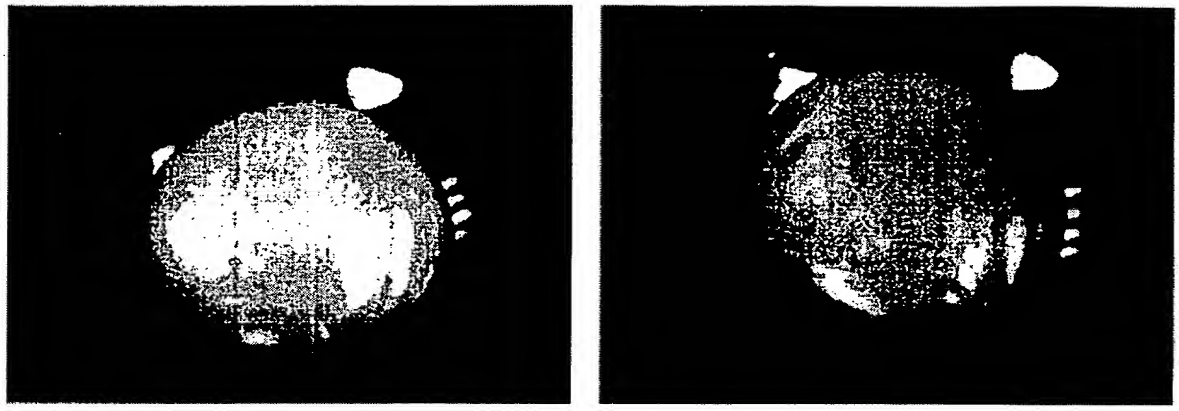

Figure 1: Photographs of the surface of the two puddings prepared, left the pudding prepared from Pudding sample A (EP 0 796 868), right the pudding prepared from Pudding sample B (present invention).

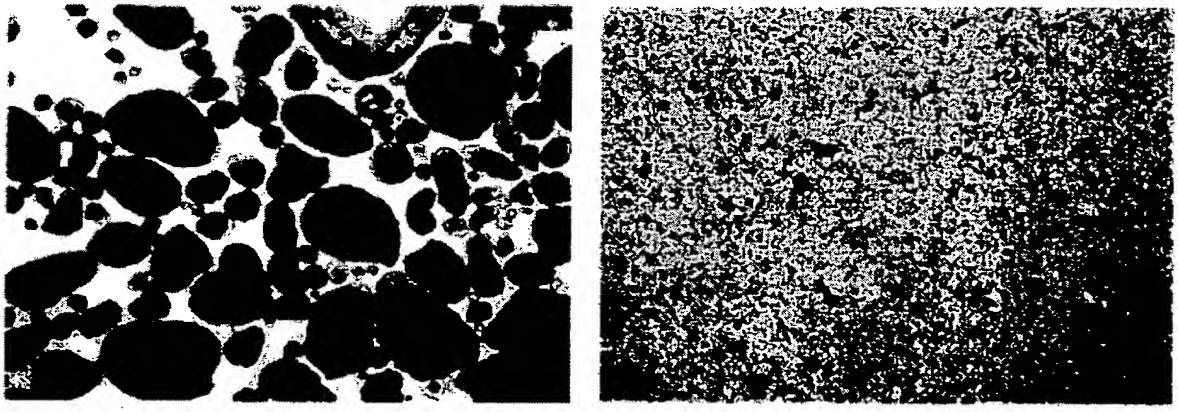

Figure 2: Microscopic photographs of representative samples of both puddings, left the pudding prepared from Pudding sample A (EP 0 796 868) showing starch granules, right the pudding prepared from Pudding sample B (present invention), showing discrete starch particles.

Fruit pie filling (Reproduction of Example 12 of EP 0 796 868)

Ingredient	wt.%
Sugar	12.0
Red berry juice*	1.0
Salt	0.2
Cherry juice** (20% sugar)	30.0
Starch ES 031209-1	3.0
Water	53.8

* EP 0 796 868 uses Lemon Juice. We used the same amount of Red berry juice. To my knowledge, this is of no consequence to the final result.

** EP 0 796 868 uses Spray Dried Cherries powder. We used Cherry juice, which contained 20% sugar. We therefore lowered the amount of sugar to be added by about 6 wt.%, and lowered the amount of water to balance. To my knowledge, this is of no consequence to the final result.

Preparation of the foodstuff

- Blend all ingredients together
- Heat to 90°C
- Keep at 90°C for 5 minutes
- Split up into 2 samples, keep 1 sample apart (Pie filling sample A), and shear 1 sample during 1 minute at full speed with a Silverson mixer (Pie filling sample B)
- Cool to 40°C

Results

Fruit pie fillings produced from both samples were short and smooth and had a comparable viscosity. It was clearly visible that the fruit pie filling prepared from pie filling sample A (EP 0 796 868, i.e. without the shearing step) was duller than the fruit pie filling prepared from pie filling sample B (present invention), which was subjected to a shearing step. The fruit pie filling prepared from pie filling sample B was very shiny.

Below are photographs of the surface of the two fruit pie fillings prepared (figure 3). It was clearly visible by visual inspection of the two fruit pie filling surfaces that there was a marked difference in gloss and shininess between the two fruit pie fillings, which difference is difficult to reproduce in a photograph.

Below are also microscopic pictures of the two fruit pie fillings. The difference in granule size is apparent (figure 4).

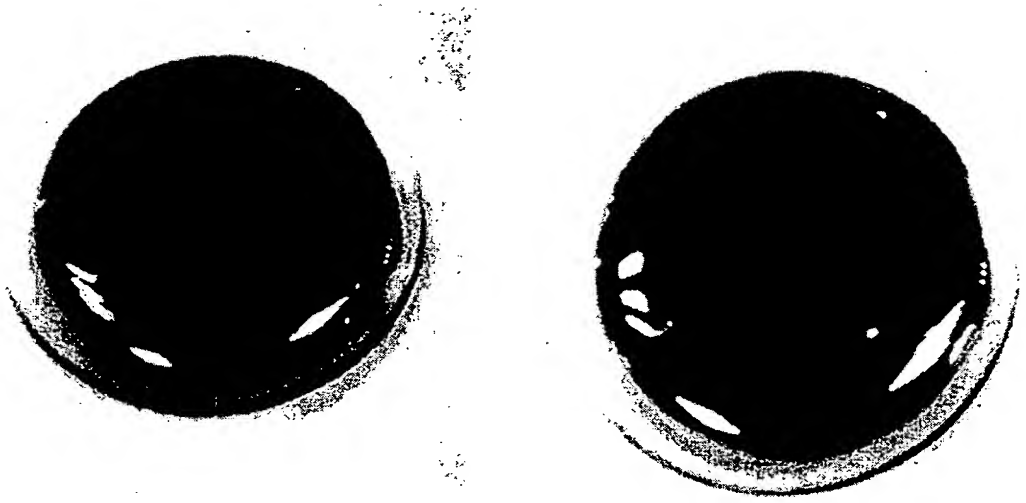

Figure 3: Photographs of the surface of the two fruit pie fillings prepared, left the pie filling prepared from pie filling sample A (EP 0 796 868), right the pudding prepared from pie filling sample B (present invention).

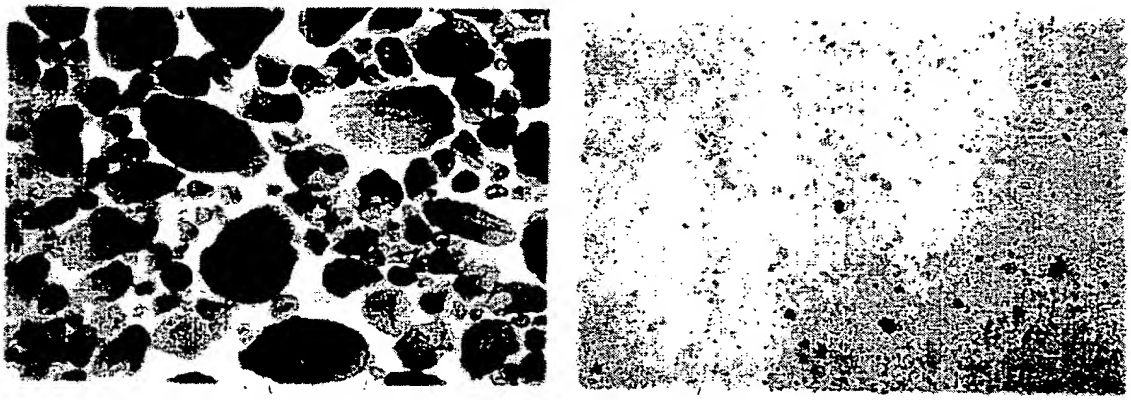

Figure 4: Microscopic photographs of representative samples of both fruit pie fillings, left the pie filling prepared from pie filling sample A (EP 0 796 868) showing starch granules, right the pie filling prepared from pie filling sample B (present invention), showing discrete starch particles.

7. The results of the tests as described above are proof of the argument that the characteristics of the foodstuffs prepared by a method of the present invention and those of the foodstuffs prepared by a method of EP 0 796 868 differ.

8. The undersigned declares that all statements made herein are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements and the like so made may jeopardize the validity of the document, or application, or any patent issuing thereon.

Signed this _____ day of_____ , 2004

By _____

(Dr. C. Semeijn)